

Claims

1. A load lock for a lithographic apparatus arranged to transfer an object into and from the lithographic apparatus, comprising:

an outer wall at least partly defining a load lock volume accommodating a support unit constructed and arranged to support said object when in said load lock at a predetermined pressure, said outer wall being constructed and arranged to permit said object to be transferred between said load lock volume and the lithographic apparatus outside said outer wall; and

a temperature conditioned structure constructed and arranged to control a temperature of said object to a desired temperature at least before said object is transferred from said load lock towards the lithographic projection apparatus.

2. A load lock according to claim 1, wherein said temperature conditioned structure includes at least one of said outer wall and said support unit.

3. A load lock according to claim 1, wherein said temperature conditioned structure comprises lines allowing a temperature controlled fluid to flow therethrough.

4. A load lock according to claim 1, wherein said support unit is provided with a supply line and a drain line, said supply line configured to provide a gas between said support unit and said object to provide a thermal bridge between said support unit and said object.

5. A load lock according to claim 1, wherein said support unit is constructed and arranged to substantially protect said object from a gas flow against a surface of said object when said load lock volume is depressurized.

6. A load lock according to claim 1, wherein said load lock is provided with a pump to depressurize said load lock volume.

7. A load lock according to claim 6, wherein said pump is connected to a processor arranged to depressurize said load lock volume by said pump to a predetermined first

pressure, to wait during a predetermined time period and then to depressurize said load lock volume to a predetermined second pressure.

8. A load lock according to claim 6, wherein said pump is connected to a processor arranged to depressurize said load lock volume by said pump from a first pressure to a second pressure, said processor also being arranged to control said temperature conditioned structure such that said object is at a predetermined temperature that is higher than said desired temperature when said processor starts depressurizing said load lock volume.

9. A load lock according to claim 6, wherein said pump is connected to an opening arranged centrally underneath the support unit, said object being a substrate and said support unit being arranged to support said substrate substantially above said opening.

10. An assembly in a lithographic apparatus, said assembly comprising:
a support structure having a body constructed and arranged to support a substrate;
and
a volume between said substrate and said support structure,
said body of said support structure including a supply line to supply a gas in said volume between said substrate and said support, and said support structure being constructed and arranged to control the temperature of said substrate via said gas in said volume.

11. An assembly according to claim 10, wherein, in use, said gas in said volume has a pressure in the range of 50 to $1.5 \cdot 10^7$ Pa .

12. An assembly according to claim 10, wherein said supporting structure is provided with a clamp to clamp said substrate against said body.

13. An assembly according to claim 10, wherein said body comprises a rim to seal said volume.

14. An assembly according to claim 10, wherein said body comprises lines allowing a temperature controlled fluid to flow therethrough.

15. An assembly according to claim 10, wherein said support structure comprises a stationary body and is arranged to rotate said body in use within said stationary body, said body and said stationary body defining a gap between them that is in communication with said volume, said stationary body having lines allowing a temperature controlled fluid to flow therethrough.

16. An assembly according to claim 15, wherein said gap is sealed with a seal, such that said gap may comprise a gas of a higher pressure than an environment of said support structure.

17. An assembly according to claim 16, wherein said stationary body comprises an opening for draining gas present in said gap and reducing gas leakage via said seal.

18. An assembly according to claim 15, wherein said supply line is provided with a valve to close said supply line when no substrate is present.

19. A load lock according to claim 5, wherein said support unit is designed to cover substantially said object, in use, and comprises a connection structure constructed and arranged to connect said support unit to said outer wall.

20. A load lock according to claim 19, wherein said support unit has a semi-circular upper surface.

21. A load lock according to claim 19, wherein said support unit has a semi-circular lower surface.

22. A load lock according to claim 1, wherein said load lock comprises a volume decreasing device constructed and arranged to decrease said gas volume adjacent a surface of said object positioned on said support unit.

23. A load lock according to claim 22, wherein said support unit comprises a support plate of a size about equal to or larger than said object to be supported thereon,

wherein a ceiling plate is provided above said support unit, said ceiling plate having a size of about equal to or larger than said object; and
wherein said volume decreasing device comprises a positioning unit constructed and arranged to:
decrease the distance between said support plate and said ceiling plate of said support unit prior to and/or during depressurization of said load lock chamber;
and
to increase the distance between said support plate and said ceiling plate prior to said object being removed from or delivered to said support unit.

24. A load lock according to claim 23, wherein said positioning unit is adapted to act on said support plate, while said corresponding ceiling plate is arranged in a stationary manner in said load lock volume.

25. A lithographic projection assembly comprising:
a radiation system constructed to provide a beam of radiation;
a patterning device serving to pattern said beam of radiation according to a desired pattern and form a patterned beam;
a projection system that projects said patterned beam; and
a load lock arranged to transfer an object into and from a lithographic apparatus, said load lock comprising:

an outer wall at least partly defining a load lock volume accommodating a support structure constructed and arranged to support the object when in said load lock at a predetermined pressure, said outer wall being constructed and arranged to permit the object to be transferred between said load lock volume and said lithographic apparatus outside said outer wall,

said support structure having a body constructed and arranged to support the object and a volume existing between the object and said support structure,

said body of said support structure including a supply line to supply a gas in said volume between the object and said support structure, and said support structure being constructed and arranged to control the temperature of the object via said gas in said volume.

26. A lithographic projection assembly according to claim 25, wherein

said load lock is constructed and arranged to transfer an object between a first environment and a second environment;

said lithographic projection assembly further comprising:

an object handler comprising a handler chamber in which said second environment prevails; and

said projection system comprising a projection chamber, wherein said handler chamber and said projection chamber are constructed and arranged to exchange the object between themselves.

27. A lithographic projection assembly according to claim 26, wherein said projection assembly comprises:

a support structure constructed and arranged to support said patterning device;

a substrate table for holding a substrate; and

said projection system constructed and arranged to project said patterned beam onto a target portion of said substrate.

28. A method for manufacturing a device comprising:

providing a substrate that is at least partially covered by a layer of radiation-sensitive material;

providing a beam of radiation using a radiation system;

patterning the beam with a pattern in its cross-section; and

projecting the patterned beam of radiation onto a target portion of the layer of radiation-sensitive material,

providing the substrate to a lithographic projection apparatus through a load lock, the load lock having an outer wall at least partly defining a load lock chamber accommodating a support structure supporting the substrate when in the load lock at a predetermined pressure, and

controlling the temperature of the substrate via a gas in a volume between the substrate and the support structure.